Introduction to Advanced Bioinformatics

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Spring Semester 2010
The technical stuff

- AN ABSOLUTE PREREQUISITE FOR THIS COURSE IS INTRODUCTION TO BIOINFORMATICS OR AN EQUIVALENT COURSE!!!!

- This course is build for Biologists with some bioinformatics background. We will assume bioinformatics knowledge of the material of the basic course, and biology knowledge at the graduate level
The technical stuff

- This course will require the use of UNIX (in the second half).

- We will give a UNIX refresher lecture in the hands-on sessions
The technical stuff

The course website:

http://bip.weizmann.ac.il/course/advbioinfo
The technical stuff

The course is made up of one lecture and optional hands-on session each week.

The hands-on sessions are not mandatory, they are only there to help. Demonstrations of the programs will be done in both the lectures and the hands-on sessions. The hands-on sessions are an opportunity for you to do the assignment with somebody there to ask for help if you get stuck.
The technical stuff

- There is an option to participate in part of the course, without handing in assignments and without a grade.

- The course will be taught topic-by-topic, so if only one or two topics are of interest, feel free to come to just those lectures that interest you.
Registration

- If you plan on taking this course for credit, please send me an email with your name, id number and preferred email address. This way any course announcements will reach you.

- If you plan on attending a hands-on session, please tell me in the email which you prefer, so that we can make sure there is enough space in the computer room.
Requirements for a grade

• You are required to do all of the assignments and a final project

• The course grade is composed as follows: 60% final project, 40% assignments
Assignments

• You have two weeks to hand in each assignment.

• Assignments are to be handed in at the Wolfson lecture hall, by the end of the lecture (13:00).

• If for any reason you need/want an extension, talk to us BEFORE the assignment is due.

• An assignment handed in late or not at all will get a 0.
Assignments

You may consult with a friend while doing the assignment (strongly encouraged!), however all work must be handed in individually. If we find copying the grade will be divided among the number of students handing in the same answer sheet.

Assignments should be printed and handed in. Electronic submission (e-mail) WILL NOT be accepted.
Final Project

- The final project will be assigned in early June
- It will be due on July 28
- Final projects must be done individually
- Late projects will not be accepted
- There is NO possibility to correct projects
- There will be a required personal meeting with us to choose a project topic
Announcements, Updates

- Any news will be announced in the lectures and updated on the website, and if necessary emailed.

- What is said in the lecture hall is the final word, unless specified otherwise.
If you have questions, comments, suggestions or complaints, please contact us – the earlier the better!
How to contact us:

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We don’t bite!
Introduction to Advanced Bioinformatics
aka: Topics in Advanced Bioinformatics
aka: What is usually in our workshops
aka: Topics in Functional Genomics
aka: Topics in Functional Annotation
Philosophy of the course

- What is the function of the sequence we work with, be it DNA, RNA or Protein?

- How much can we actually learn using computational tools?

- How reliable are the computational results, and how can I validate them in the lab?
Problems with bioinformatics

- Biologists and Algorithm Developers look at problems differently
- Biologists and Algorithm Developers measure success differently
“Unsurprisingly, each of the models that we trained performed very well on the data set on which it was trained. When it comes to predicting transcriptomics data, the model trained on these data performs as well as a replicate experiment with a relatively low (0.4) correlation coefficient would perform (Fig. 5, left panel).

In other words, given the noise in some experimental data sets, it is not possible to train a better model from these data, although the situation may change as more reproducible data sets become available.”

Hausser et al, Genome Research 2009 19:2009-2020